UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/009,530	01/22/2002	Trevor Martin	124-909	4032

7590 01/30/2004

Nixon & Vanderhye
8th Floor
1100 North Glebe Road
Arlington, VA 22201-4714

EXAMINER	
ANDERSON, MATTHEW A	

ART UNIT	PAPER NUMBER
1765	

DATE MAILED: 01/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/009,530	MARTIN ET AL.	
	Examiner	Art Unit	
	Matthew A. Anderson	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 September 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *6 and 7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *6 and 7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claim 6,7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goodhue (US 4855255) in further view of Moerman (IEEE Journal of Selected Topics in Quantum Electronics, 3(6), pp. 1308-1320, December 1997.)\ and further in view of Colas et al. (Applied Physics Letters, 59(16), pp. 2019-2021, 14 October 1991.).

Goodhue discloses tapered laser or waveguide devices made by gradient thermal heating during epitaxial growth of III-V semiconductors such as GaAs and AlGaAs (see abstract). Fig. 9 details an example with MPE (molecular beam epitaxy). CBE (chemical beam epitaxy) is disclosed in col. 10 lines 50-53 as an alternative method of deposition.

Goodhue does not disclose the use of a mechanical mask to form the tapered layer.

Moerman et al. discloses the known fabrication technology used to form tapers in III-V semiconductor devices. Fig. 7 and the last paragraph in col. 1 describe the mechanical shadow masked growth technique by which an easily removable monocrystalline Si mask is placed over the substrate and both tapered and un-tapered layers are grown in a single step (see especially Fig. 7 (f).

It would have been obvious to one of ordinary skill in the art at the time of the present invention to combine the descriptions of Goodhue and Moerman because Moerman describes the mechanical mask as easily removed after the growth thus simplifying the process.

This combination does not explicitly describe the mechanical shadow mask as having a oxide film coating on which deposition is retarded at the process conditions.

Colas et al. discloses that it was known to effect the local growth rate by choosing the pattern of dielectric (e.g. SiO_2) masked layers during selective area growth of III-V semiconductors.

It would have been obvious to one of ordinary skill in the art at the time of the present invention to combine the oxide layer because this would prevent contamination from superfluous deposited material on the mask.

It would have been obvious to one of ordinary skill in the art at the time of the present invention to grow a tapered epitaxial layer by CBE upon a substrate by using a mechanical shadow mask because such is suggested by the combined disclosures.

It would have been obvious to one of ordinary skill in the art at the time of the present invention to grow both tapered and un-tapered portions of the epitaxial layer because such is clearly suggested by Fig. 7(f) of Moerman et al.

It would have been obvious to one of ordinary skill in the art at the time of the present invention to fabricate a waveguide device in the manner claimed because such is suggested by Moerman in the abstract .

Thus, it would have been obvious to one of ordinary skill in the art at the time of the present invention to use etched Si wafers (as per Moerman et al;.) with an oxide mask to prevent deposition on the mask.

Response to Arguments

4. Applicant's arguments filed 9/25/2003 have been fully considered but they are not persuasive.

5. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections

are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Goodhue suggests tapered layer formation with CBE. Moerman discloses that such tapered layer deposition be achieved using a mechanical shadow masks. Colas discloses dielectric (e.g. SiO_2) masks and suggests that these masks effect the deposition rate. Moerman states that no growth occurs with a dielectric mask in MOVPE tapered growth. Goodhue suggests that CBE and MOVPE (aka. MOCVD) are interchangeable methods in col. 10 lines 50-55.

The argument that oxygen contamination would have precluded oxide masks in the process is not convincing. Moerman describes dielectric masks as SiO_2 masks on page 1314 in the first column.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew A. Anderson whose telephone number is (571) 272-1459. The examiner can normally be reached on M-Th, 7-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

MAA
January 22, 2004

SUPERVISOR
NADINE G. NORTON
PRIMARY EXAMINER